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(54) Device for administering solid preparations

Vorrichtung zur Verabreichung von festen Präparaten

Dispositif pour l'administration de préparations solides

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Description

This invention relates to a device for administering solid or semisolid preparations in subcutaneous layers of a patient.

In the past, subcutaneous implantation of solid preparations in the body has required a surgery that takes a lot of labor and is accompanied by physical and mental sufferings and, occasionally, a surgical scar.

To solve such problems, some of the inventors have recently proposed a device for administering solid or semisolid preparations in the body through the skin, for example, in EP-A-139286 and JP-A-documents 60-227772, 60-129057, 61-79470, 61-82761 and 61-180400. Such a device generally comprises a hollow needle and a plunger slidably arranged in the needle and makes it possible to inject solid or semisolid preparations in the subcutaneous layers of a patient without performing any surgical operation. However, such a device makes it difficult to aseptically administer solid or semisolid preparations in the body.

To solve said problem EP-A-255123 proposes a device for subcutaneous implantation of solid preparations that comprises a hollow barrel with a capsule chamber, a hollow needle attached to the tip of the barrel, and a plunger slidably arranged in the barrel. Such a device may be used in combination with capsules containing solid or semisolid preparations, and the preparations are first ejected from the capsule by the plunger and then injected into the subcutaneous layers through the needle. Thus, such a device makes it possible to implant solid or semisolid preparations aseptically, but it also has some problems awaiting a solution. For example, when loading the capsule into the barrel, the operator is required to focus his concentration on an opening of the capsule chamber because of its small diameter. In addition, such a device requires prudent cares to prevent the plunger from bending or breaking since the plunger is occasionally caught in the barrel.

US-A-2009393 discloses a device according to the preamble of claim 1.

It is therefore an object of the present invention to provide a device for administering solid or semisolid preparations in the body, which is simple to handle and makes it possible to aseptically handle solid or semisolid preparations during subcutaneous implantation.

Another object of the present invention is to provide a device for administering solid or semisolid preparations in the body, which makes it possible to administer solid or semisolid preparations in the subcutaneous layers easily and smoothly.

These objects are solved with the features of the claims.

According to the present invention, there is provided a device for administering solid or semisolid preparations in an organism subcutaneously, comprising a barrel having a nozzle for attachment of a hollow needle, and a plunger slidably arranged in the barrel, said plunger comprising a plunger body of an outside diameter equal to or slightly smaller than the inside diameter of said barrel, and an elongated, small-sized rod portion, connected to the tip of the plunger body, of an outside diameter equal to or slightly smaller than the inside diameter of said needle, the length of said small-sized rod portion being so designed that the tip of the rod portion protrudes for a certain distance beyond the tip of the needle when said plunger is forced into the barrel until said plunger body reaches its innermost position.

The device of the present invention is used in combination with a guide member adapted to be contained within the barrel. The guide member is provided with a funnel-shaped guide hole to facilitate insertion of the small-sized rod portion of the plunger into the lumen of the needle. The guide hole includes a tapered guide portion and an elongated straight portion extending from the small end of the tapered guide portion to the tip of the guide member. The guide member is designed to have an outside diameter slightly smaller than the inner diameter of the barrel though the size and configuration of the guide member may be varied to suit specific requirements. The front part of the guide member may be tapered to fit with a tapered front inner wall of the barrel.

To ensure aseptic handling of the solid or semisolid preparations, it is preferred to use such a guide member as a capsule for solid or semisolid preparations. In this case, the guide hole of the guide member containing one or more preparations is sealed by a film of a biocompatible material at the tip end of the guide member and a cap at the opposite end to give a hermetically sealed encapsulation.

In a preferred embodiment of the present invention, there is provided a device for administering solid or semisolid preparations in an organism subcutaneously, comprising a barrel having a nozzle for attachment of a hollow needle, a plunger slidably arranged in the barrel, and a guide member adapted to be snugly accommodated within the lumen of the barrel, said guide member having an outside diameter slightly smaller than the inside diameter of the barrel and being provided with a funnel-shaped guide hole, said plunger comprising a plunger body of an outside diameter equal to or slightly smaller than the inside diameter of said barrel, and an elongated, small-sized rod portion of an outside diameter equal to or slightly smaller than the inside diameter of said needle, said small-sized rod portion being connected to the tip of the plunger body and having a length equal to or slightly smaller than the distance from the rear end of the guide member to the tip of the needle. In this, the guide member is loaded into the barrel so that it comes into contact with the front inner wall of the barrel, and the small-sized rod portion of the plunger is designed to have a length corresponding to the distance from the needle point to the rear end of the guide member loaded in the barrel. Thus, when the plunger is forced into the barrel loaded with the guide member until the tip end of the large-sized slide portion of the plunger comes into contact with the rear end of the guide member, the tip end

of the small-sized slide portion of the plunger is stopped in the area within the edge portion of the needle.

In another preferred embodiment, the needle is provided with an air hole through which air in the barrel and the needle is discharged when the plunger is forced into the barrel. The needle may be attached to the tip of the barrel in any way. For example, if the needle is a cylindrical hollow tube with no hub, the needle is inserted into and fixed to the nozzle with adhesive. In this case, the needle is so designed that it has an outside diameter equal to the inside diameter of the nozzle. If the needle is provided at its one end with a hub, the needle is attached to the barrel by inserting the nozzle of the barrel in the hub of the needle.

In the solid preparation administering equipment of the present invention, the guide member containing at least one solid or semisolid preparations is loaded from its front part into the barrel through the rear opening of the barrel and, the preparations in the guide member are injected into the body through the hollow needle by forcing the plunger into the barrel until the tip end of the large-sized slide portion comes into contact with the rear end of the guide member. Thus, the device of the present invention may hereinafter be called "a solid preparation injector".

The invention will be further apparent from the following description taken in conjunction with the accompanying drawings which show, by way of example only, preferred embodiments thereof.

BRIEF EXPLANATION OF THE DRAWINGS:

Fig. 1 is a perspective view of a solid preparation injector embodying the present invention;

Fig. 2 is an exploded perspective view of the injector of Fig. 1;

Fig. 3 is a perspective view of the injector of Fig. 1 with a guide member containing a solid preparation and being loaded therein;

Fig. 4 is a section view of the injector of Fig. 1 in the operated condition;

Figs. 5 to 8 are cross sections showing various configurations of a guide member or capsule embodying the present invention; and

Fig. 9 is a perspective view of a body of the guide member in Fig. 8.

PREFERRED EMBODIMENT OF THE INVENTION

Referring now to Figs. 1 and 2, there is shown a solid preparation injector 1 embodying the present invention, comprising three basic components, i.e., a barrel 3, a plunger 2 slidably arranged in the barrel 3, and a hollow needle 4 attached to said nozzle 5 of the barrel 3.

The barrel 3 is provided at its one end with a nozzle 5 for attachment of a hollow needle 4 and, at the other end, with a flange 11 which serves as a support for the device to force the plunger into the barrel. The barrel 3 has a uniform inside diameter through its entire length except for the tip end 3a that is tapered inwardly. The tapered inner wall of the tip end 3a serves as a seat for a guide member mentioned below.

As a material for the barrel, there may be used those such as glasses, metals and synthetic resins. It is, however, preferred to use a transparent material such as glasses and synthetic resins. The transparent synthetic resin includes, without being limited to, polypropylene, polystylene, polymethyl pentene, styrene-acrylonitrile copolymers. The barrel of such a transparent material makes it possible to observe loaded conditions of the guide member 15 and/or conditions of the solid preparation at the time of loading and administration.

The needle 4 is bevelled at its one end to form a pointed tip, or an edge 10. The needle 4 is provided with an air hole 14 away from the edge 10 to prevent air in the barrel from being injected into the body through the needle 4 when implanting the solid preparations 16 into the body. The air hole 14 is generally formed at a distance of not less than 5 mm, preferably, 10 to 20 mm from the edge 10 of the needle 4 so that the hole 14 is prevented from sinking into the subcutaneous layers when the needle 4 has been stabbed into the subcutaneous layers. The needle 4 is generally designed to be 0.5 to 3 mm in inside diameter and not less than 20 mm in length. The length of the needle varies with scope of applications, but usually ranges from 25 to 60 mm. The needle 4 may be made of any material, provided that it is not corroded by chemicals and has a mechanical strength sufficient to prevent the needle from breaking or bending during insertion and withdrawal. It is, however, preferred to use a stainless steel as a material for the needle. The hollow needle 4 is press-fitted into the nozzle 5 of the barrel 3 and fixed thereto with an adhesive.

The plunger 2 is composed of a plunger body 6 and an elongated, small-sized rod portion 7 connected at its one end to the tip of the plunger body 6. The plunger body 6 is of a cross-shaped section and is integrally molded with a flange 12. The plunger body 6 also includes a large-sized slide portion 8 to be engaged with an inner wall of the barrel 3. The large-sized slide portion 8 has a diameter nearly equal to the inside diameter of the barrel 3. Preferably, the large-sized slide portion 8 is provided with a ring-like gasket 13 of a rubberlike elastic material to allow the plunger body 6 to move smoothly. The elastic material for the ring-like gasket 6 includes, without being limited to, butyl rubber and silicone rubber. However, if the needle 4 attached to the nozzle 5 has no air hole, it is preferred that the plunger has no gasket and is provided at its large-sized slide portion 8 with one or more grooves extending in the direction parallel to the center axis of the plunger body 6.

As a material for the body member 6, there may be used those such as glasses, metals and synthetic resins. It is preferred to use, synthetic resins such as polypropylenes, polystyrenes and the like.

The small-sized rod portion 7 is a rodlike component, preferably, of stainless steel and fixed to the tip of the plunger body 6. The small-sized rod portion 7 is

designed to have a diameter equal to or smaller than the inner diameter of said needle; and its length is so determined that the tip 9 of the small-sized rod portion 7 protrudes for the determined distance beyond the edge 10 of the needle 4 when the plunger 2 is forced into the barrel 3 until the plunger body 6 reaches its innermost position, at which the tip end of the plunger body 6 comes in contact with the tapered inner wall of the barrel 3. In other words, the length of the small-sized rod portion 7 is determined by the lengths of the needle 4, nozzle 5 and a guide member 15 and a distance between the tip 9 of the guide member 15 and the rear end of the needle 4. Thus, when the plunger 2 is fitted in the barrel 3 with the guide member 15 and then forced into the barrel 3 until the tip of the large-sized slide portion 8 comes into contact with the rear end of the guide member 15, the tip of the small-sized rod portion 7 is located in the area within the edge 10 of the needle 4.

As noted previously, the solid preparation injector 1 is used in combination with the guide member 15. As shown in Fig. 5, the guide member 15 is a hollow body 15' with a funnel-shaped guide hole composed of a tapered guide portion 17 and an elongated straight portion (hereinafter referred to lumen) 18 extending from the small end of the tapered guide portion 17 to the tip of the guide member 15. The guide member 15 has an outside diameter slightly smaller than the inner diameter of the barrel 3 and is tapered at its front part to make it fit the tapered inner wall of the barrel 3.

The guide member 15 can be produced in a variety of shapes, provided that the guide member is loaded into the lumen of the barrel 3 smoothly and fits into the tip shape of the lumen of the barrel 3. For example, the guide member 15 may be a piece of body which decreases gradually in diameter so that it assumes an elliptical cone as shown in Fig. 7. Also, the guide member 15 may be provided in the outside wall of its main part (indicated by a reference symbol d in Fig. 5) with several grooves, for example, four or eight grooves 15b extending in the direction parallel to the axis of the guide member 15 as shown in Figs. 8 and 9, or with a circular groove. If the front end of the barrel 3 is formed by a flat wall having a nozzle, the guide member is produced in the form of a cylinder having a guide hole. Further, the tapered guide portion 17 of the guide hole may be replaced with the one formed by an elliptic paraboloid as shown in Fig. 7.

When the guide member 15 is used as a capsule for a solid or semisolid preparation, one or more solid or semisolid preparations 16 are loaded into the lumen 18 of the guide member 15, which is then sealed by a sealing means, i.e., a cap 19 and a sealing film 20, as shown in Fig. 6, to prevent the preparation 16 from discharging and to protect the same from any form of contamination. The cap 19 is removably attached to the rear end of the guide member 15, while the film 20 is attached to the tip end of the guide member. This guide member or guide capsule 15 makes it possible to aseptically perform subcutaneous implantation of the preparation.

As a material for the guide member or guide capsule, there may be used any material provided that it causes no interaction with the preparations. It is, however, preferred to use a transparent synthetic resin. Such a transparent resin includes, without being limited to polyethylene, polypropylene, polystyrene, acrylonitrile-butadiene-styrene copolymers and silicones.

The cap 19 is so shaped that it may be fitted to the tapered guide portion 17 of the guide member 15 and engaged with the outside wall of the guide member 15 to prevent it from separation during transportation. As a material for the cap, there may be used any of the materials used for the guide member. It should be noted that the cap 19 is not necessarily made of the same material with the guide member 15.

The film 20 is of biocompatible material, which meets requirements to ensure aseptic protection of solid preparations and to be fractured easily at a light load given by the small-sized rod portion 7 of the plunger 2. Such a biocompatible material includes, without being limited to, gelatin, collagen, starch, cellulose, albumin, silicone and the like. Also, elastic materials such as natural rubbers, silicone rubbers may be used as a material for membrane, provided that the film has a cut in the form of cross or asterisk.

The film 20 may be attached to the guide member 15 using a suitable adhesive or fixing member. If the guide member 15 has no means for supporting the film 20 as shown in Fig. 6, it is preferred to fit the film 20 to the tip of guide member 15 with an adhesive. If the guide member 15 is provided with a projection 15a at the tip end as shown in Figs. 8 and 9, the film 20 is sandwiched by the tip end of the guide member 15 and a hold-down ring 23 used as a supporting means.

For the solid or semisolid preparation 16 there is no specific limitation, but the preparation is generally composed of one or more active ingredients, or one or more active ingredients and at least one component selected from the group of carriers and additives used, as needed.

As the active ingredients, there may be used any of the conventionally known active ingredients, which include, without being limited to, interferon, interleukin, tumor necrosis factor, mitomycin, adriamycin, 5-fluorouracil, prostaglandin, prostacyclin, taspamin, hormones, hormone releasing factors. The carrier includes, without being limited to, proteins such as collagen, gelatin, albumin; biologically catabolic materials represented by synthetic polymers such as polyglycolic acid, polylactic acid, polyglutamic acid; and silicones which are catabolic with the biological structure.

The solid preparation may be produced in a variety of shapes, for example, in the form of a rod, needle, globule, disk and the like. For rod-shaped solid preparations, a preferred diameter ranges from 0.25 to 2.5 mm and the length is 3.0 to 50 mm. For globular solid preparations, a preferred diameter ranges from 0.25 to 2.5 mm.

The injector 1 of the present invention may be used in combination with any of the guide members 15 shown in any one of Figs. 5 to 9 to allow the small-sized rod

portion of the plunger to smoothly enter into the lumen of the needle member. One or more solid preparations to be implanted into the subcutaneous layers of a patient is preferably contained in the guide capsule and/or the hollow needle member.

In use, the plunger 2 is first removed from the barrel 3 and then the guide member 15 is loaded into the barrel 3 so that its tapered tip end goes ahead. If the guide member 15 is a guide capsule containing the solid or semisolid preparation 16 as shown in Fig. 6, the guide capsule 15 is loaded into the barrel 3 after removal of the cap 19. The plunger 2 is then inserted in the lumen of the barrel 3 and moved forwardly until the tip end of the small-sized rod portion 7 comes into contact with the guide member 15, as shown in Fig. 3. At that time, the guide capsule 15 is in the condition such that its tapered front portion is in contact with the tapered inner wall of the barrel 3.

After inserting the plunger to a suitable position in the barrel 3, the pointed end of the needle 4 is stabbed into the subcutaneous layers of a patient to be treated (indicated by the reference symbol B in Fig. 4) and the plunger 2 is further forced into the barrel 3 until the tip end of the large-sized slide portion 8 comes into contact with the rear end of the guide capsule 15. During this step, the solid preparation 16 is pressed into the lumen of the needle 4 by the small-sized rod portion 7 of the plunger 2 and then implanted into the subcutaneous layers (B) of the patient. When the tip end of the large-sized slide portion 8 of the plunger 2 comes into contact with the rear end of the guide member 15, the tip end 9 of the small-sized rod portion 7 of the plunger 2 is stopped in the area within the edge portion 10 of the needle 4 since the length of the small-sized rod portion 7 is determined in consideration for the lengths of the guide member 15, nozzle 5 and needle 4, and a distance between the tip end of the guide member 15 and the rear end of the needle 4. Thus, the solid preparation is implanted in the subcutaneous layers certainly without causing protrusion of the small-sized rod portion beyond the edge 10 of the needle 4.

The combined use of the needle and guide member each containing the same or different solid preparation makes it possible to implant the solid preparations at one time.

As will be understood from the above, the device of the present invention makes it possible to implant the solid preparations into the subcutaneous layers of the patient certainly and smoothly without causing extra damage to the organism. The combined use of the device and the guide member containing solid or semisolid preparations makes it possible to aseptically administer the preparations in the subcutaneous layers of the patient. Further, the combined use of the device, the needle containing a solid preparation and the guide capsule containing a solid preparation makes it possible to perform subcutaneous implantation of two or more preparations which are the same or different from each other.

Claims

1. A device for subcutaneously administering solid or semi-solid preparations in an organism, comprising a hollow needle (4) having a pointed end (10), a barrel (3) having a nozzle (5) for attachment of said hollow needle, and a plunger (2) slidably arranged in said barrel (3) and having an elongated small-sized rod portion (7), characterized in that said plunger (2) comprises a plunger body (6) with an outside diameter equal to or slightly smaller than an inside diameter of said barrel, said small-sized rod portion (7) having an outside diameter equal to or smaller than the inside diameter of said needle (4), being connected at one end to the tip of said plunger body (6), and having a length so determined such that the tip of the rod portion (7) protrudes for a certain distance beyond the tip of the needle (4) when said plunger (2) is forced into the barrel (3) until said plunger body reaches its innermost position, and that said device includes a guide member (15) loaded in said barrel, said guide member (15) having an outside diameter slightly smaller than the inner diameter of the barrel (3) and being provided with a guide hole composed of a tapered guide portion (17) and an elongated straight portion (18) extending from the small end of the tapered portion to the tip of the guide member (15).

2. The device according to claim 1, wherein said barrel (3) is of a transparent synthetic resin.

3. The device according to claim 1 or 2, wherein said needle comprises an air hole (14) for discharging air in the barrel and the needle.

4. The device according to claim 1, 2 or 3, wherein the needle (4) is a cylindrical hollow tube with no hub and has an outside diameter equal to the inside diameter of the nozzle of the barrel, and wherein the needle is being fixed in the nozzle of the barrel (3) with adhesive.

5. The device according to claim 1, 2 or 3, wherein the needle (4) consists of a cylindrical hollow tube and a hub mounted on the base of the tube, said tube having an inside diameter equal to that of the nozzle of the barrel.

6. The device according to any one of claims 1 to 5, wherein the guide member (15) is tapered at its front part to fit with the tapered inner surface of the barrel (3).

7. The device according to claim 6, wherein the guide hole of the guide member is sealed by a cap removably mounted on the rear end of the guide member (15) and a film of a biocompatible material fixed to the tip end of the guide member (15).

8. The device according to claim 7, wherein the guide member (15) contains one or more preparations in its guide hole.

9. A guide member in combination with a device for subcutaneous implantation of solid preparations according to any one of claims 1 to 8, comprising a cylindrical body with an outside diameter slightly smaller than the inner diameter of a barrel (3) of the device, and being provided with a guide hole including a tapered guide portion and an elongated straight portion extending from the small end of the tapered portion to the tip of the guide member.

10. The guide member according to claim 9, wherein the guide member is tapered at its front part to fit with the tapered front inner wall of the barrel (3).

11. The guide member according to claim 9 or 10, wherein the guide hole of the guide member is sealed by a cap removably mounted on the rear end of the guide member and a film of a biocompatible material fixed to the tip end of the guide member.

12. The guide member according to claim 11, wherein the guide member contains one or more preparations in its guide hole.

Patentansprüche

1. Vorrichtung zum subkutanen Eingeben von festen oder halbfesten Präparaten in einen Organismus mit einer Hohlnadel (4) mit einem spitzen Ende (10), einer Hülse (3) mit einer Düse (5) zur Befestigung der Hohlnadel und einem Kolben (2), der in der Hülse (3) gleitfähig angeordnet ist und einen langgestreckten klein bemessenen Stababschnitt (7) aufweist, dadurch gekennzeichnet, daß der Kolben (2) einen Kolbenkörper (6) mit einem Außendurchmesser, der geringfügig kleiner oder gleich dem Innendurchmesser der Hülse ist, aufweist, wobei der klein bemessene Stababschnitt (7) mit einem Außendurchmesser, der kleiner oder gleich dem Innendurchmesser der Nadel (4) ist, an einem Ende mit der Spitze des Kolbenkörpers (6) verbunden ist und eine Länge hat, die so festgelegt ist, daß die Spitze des Stababschnitts (7) um eine bestimmte Strecke über die Spitze der Nadel (4) hinausragt, wenn der Kolben (2) in die Hülse (3) gedrückt wird, bis der Kolbenkörper seine innerste Stelle erreicht, und daß die Vorrichtung ein in die Hülse geladenes Führungsteil (15) aufweist, wobei das Führungsteil (15) einen Außendurchmesser hat, der geringfügig kleiner als der Innendurchmesser der Hülse (3) ist, und mit einem Führungsloch versehen ist, das aus einem verjüngten Führungsabschnitt (17) und einem langgestreckten geraden Abschnitt (18), der sich vom dünnen Ende des verjüngten Führungsabschnitts bis zur Spitze des Führungsteils (15) erstreckt, besteht.

2. Vorrichtung nach Anspruch 1, wobei die Hülse (3) aus einem durchsichtigen Kunstharz besteht.

3. Vorrichtung nach Anspruch 1 oder 2, wobei die Nadel ein Luftloch (14) zum Entweichen von Luft in der Hülse und der Nadel aufweist.

4. Vorrichtung nach Anspruch 1, 2 oder 3, wobei die Nadel (4) eine zylindrische Hohlröhre ohne Nabe ist und einen Außendurchmesser gleich dem Innendurchmesser der Düse der Hülse hat und wobei die Nadel in der Düse der Hülse (3) mit Klebstoff befestigt ist.

5. Vorrichtung nach Anspruch 1, 2 oder 3, wobei die Nadel (4) aus einer zylindrischen Hohlröhre und einer an der Basis der Röhre angebrachten Nabe besteht, wobei die Röhre einen Innendurchmesser gleich dem der Düse der Hülse hat.

6. Vorrichtung nach einem der Ansprüche 1 bis 5, wobei das Führungsteil (15) an seinem Vorderteil verjüngt ist, um zur verjüngten Innenfläche der Hülse (3) zu passen.

7. Vorrichtung nach Anspruch 6, wobei das Führungsloch des Führungsteils durch eine auf dem hinteren Ende des Führungsteils (15) lösbar angebrachte Kappe und eine auf dem vorderen Ende des Führungsteils (15) befestigte Folie aus einem biologisch verträglichen Material abgedichtet ist.

8. Vorrichtung nach Anspruch 7, wobei das Führungsteil (15) in seinem Führungsloch ein oder mehrere Präparate enthält.

9. Führungsteil in Kombination mit einer Vorrichtung zur subkutanen Implantation von festen Präparaten nach einem der Ansprüche 1 bis 8, das einen zylindrischen Körper mit einem Außendurchmesser, der geringfügig kleiner als der Innendurchmesser einer Hülse (3) der Vorrichtung ist, aufweist, und mit einem Führungsloch versehen ist, das einen verjüngten Führungsabschnitt und einen langgestreckten geraden Abschnitt aufweist, der sich vom dünnen Ende des verjüngten Abschnitts bis zur Spitze des Führungsteils erstreckt.

10. Führungsteil nach Anspruch 9, wobei das Führungsteil an seinem Vorderteil verjüngt ist, um zur verjüngten vorderen Innenwand der Hülse (3) zu passen.

11. Führungsteil nach Anspruch 9 oder 10, wobei das Führungsloch des Führungsteils durch eine auf dem hinteren Ende des Führungsteils lösbar ange-

brachte Kappe und eine auf dem vorderen Ende des Führungsteils befestigte Folie aus einem biologisch verträglichen Material abgedichtet ist.

12. Führungsteil nach Anspruch 11, wobei das Führungsteil in seinem Führungsloch ein oder mehrere Präparate enthält.

Revendications

1. Dispositif d'administration sous-cutanée de préparations solides ou semi-solides dans un organisme, comprenant une aiguille creuse (4) ayant une extrémité effilée (10), un corps de pompe (3) ayant un embout (5) destiné à la fixation de ladite aiguille creuse et un piston (2) disposé de façon à coulisser dans ledit corps de pompe (3) et ayant une partie tige allongée de petite dimension (7), caractérisé en ce que ledit piston (2) comprend un corps de piston (6) de diamètre externe égal ou légèrement inférieur au diamètre interne dudit corps de pompe, ladite partie tige de petite dimension (7) ayant un diamètre externe égal ou inférieur au diamètre interne de ladite aiguille (4) et étant reliée à une extrémité à l'avant dudit corps de piston (6) et ayant une longueur déterminée de façon telle que la pointe de la partie tige (7) fait protrusion sur une certaine distance au-delà de la pointe de l'aiguille (4) lorsque ledit piston (2) est enfoncé dans le corps de pompe (3) jusqu'à ce que ledit corps de piston atteigne sa position interne maximale, et en ce que ledit dispositif comprend un élément de guidage (15) chargé dans ledit corps de pompe, ledit élément de guidage (15) ayant un diamètre externe légèrement inférieur au diamètre interne du corps de pompe (3) et étant doté d'un trou de guidage composé d'une partie de guidage effilée (17) et d'une partie droite allongée (18) s'étendant de la petite extrémité de la partie effilée à l'avant de l'élément de guidage (15).

2. Dispositif selon la revendication 1, dans lequel ledit corps de pompe (3) est en une résine synthétique transparente.

3. Dispositif selon la revendication 1 ou 2, dans lequel ladite aiguille comprend un trou de ventilation (14) destiné à évacuer l'air se trouvant dans le corps de pompe et l'aiguille.

4. Dispositif selon la revendication 1, 2 ou 3, dans lequel l'aiguille (4) est un tube creux cylindrique dépourvu de moyeu et a un diamètre externe égal au diamètre interne de l'embout du corps de pompe et dans lequel l'aiguille est fixée dans l'embout du corps de pompe (3) au moyen d'une colle.

5. Dispositif selon la revendication 1, 2 ou 3, dans lequel l'aiguille (4) est constituée par un tube creux cylindrique et un moyeu monté sur la base du tube, ledit tube ayant un diamètre interne égal à celui de l'embout du corps de pompe.

6. Dispositif selon l'une quelconque des revendications 1 à 5, dans lequel l'élément de guidage (15) est effilé à sa partie frontale pour s'ajuster à la surface interne effilée du corps de pompe (3).

7. Dispositif selon la revendication 6, dans lequel le trou de guidage de l'élément de guidage est obturé par un capuchon monté de façon amovible sur l'extrémité arrière de l'élément de guidage (15) et un film en une matière biocompatible, fixé à l'extrémité avant de l'élément de guidage (15).

8. Dispositif selon la revendication 7, dans lequel l'élément de guidage (15) contient une ou plusieurs préparations dans son trou de guidage.

9. Elément de guidage combiné à un dispositif d'implantation sous-cutanée de préparations solides selon l'une quelconque des revendications 1 à 8, comprenant un corps cylindrique de diamètre externe légèrement inférieur au diamètre interne d'un corps de pompe (3) du dispositif et doté d'un trou de guidage comprenant une partie de guidage effilée et une partie droite allongée s'étendant de la petite extrémité de la partie effilée à l'avant de l'élément de guidage.

10. Elément de guidage selon la revendication 9, dans lequel l'élément de guidage est effilé à sa partie frontale pour s'ajuster à la paroi interne frontale effilée du corps de pompe (3).

11. Elément de guidage selon la revendication 9 ou 10, dans lequel le trou de guidage de l'élément de guidage est obturé par un capuchon monté de façon amovible sur l'extrémité arrière de l'élément de guidage et par un film en une matière biocompatible, fixé à l'extrémité avant de l'élément de guidage.

12. Elément de guidage selon la revendication 11, l'élément de guidage contenant une ou plusieurs préparations dans son trou de guidage.

Fig. 1

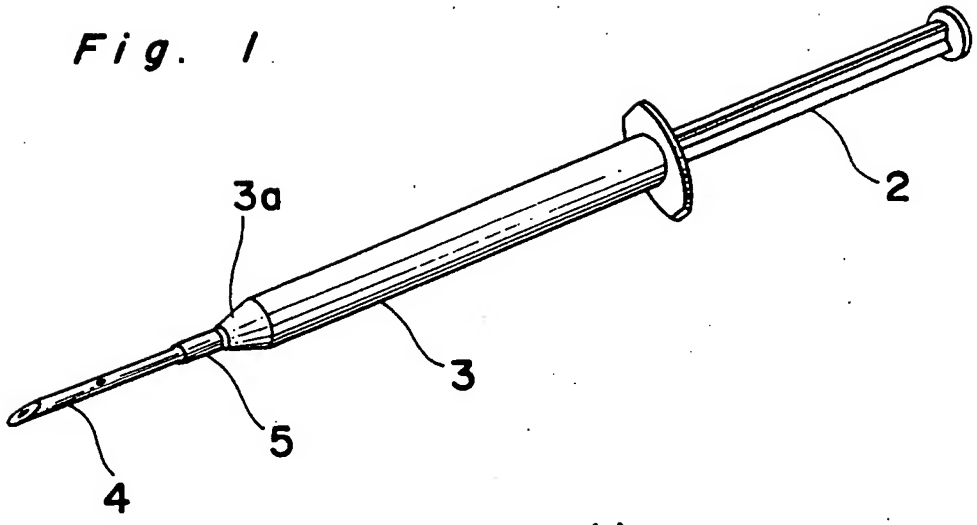

Fig. 2

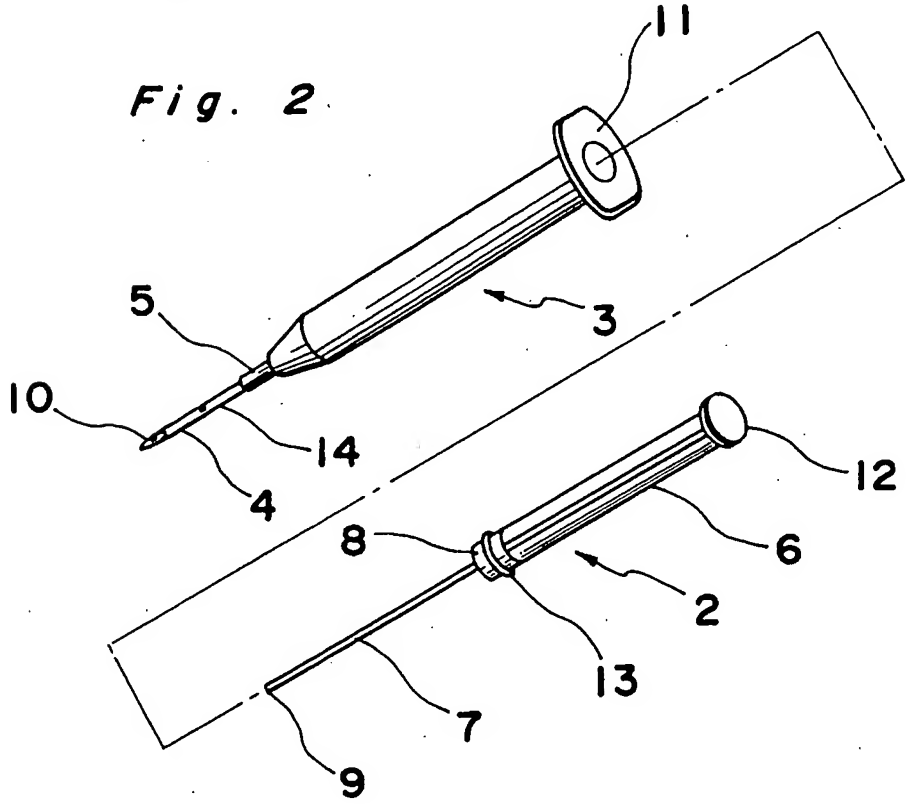

Fig. 3

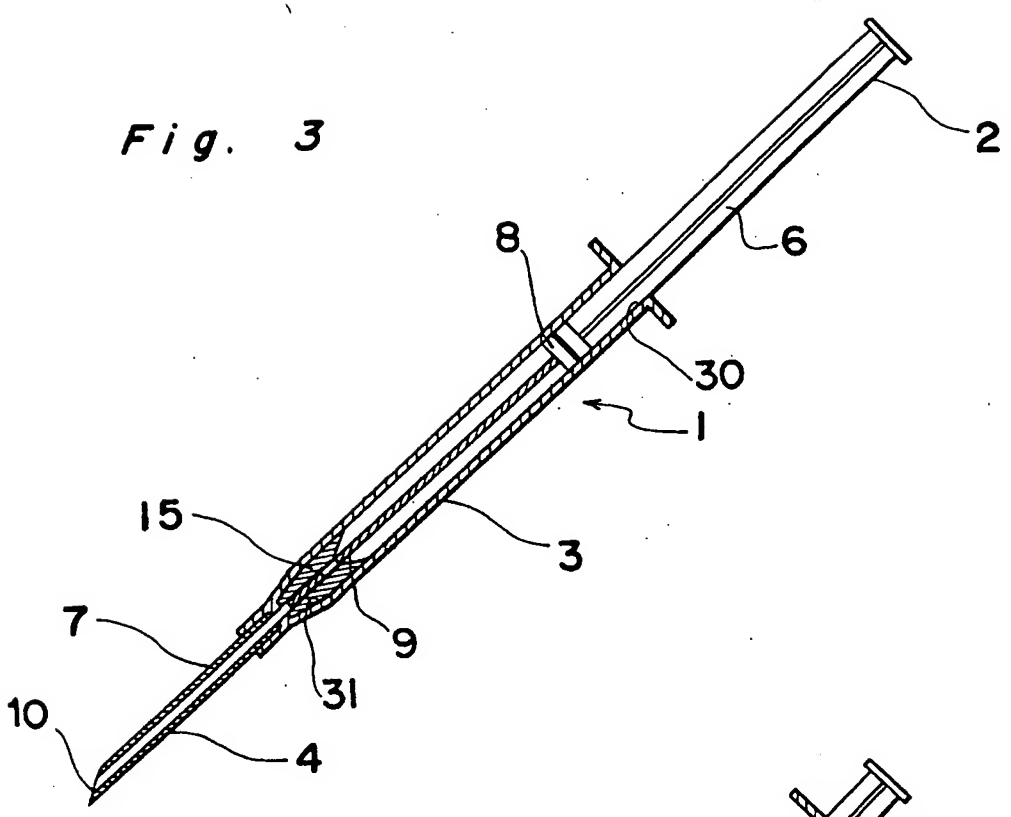

Fig. 4

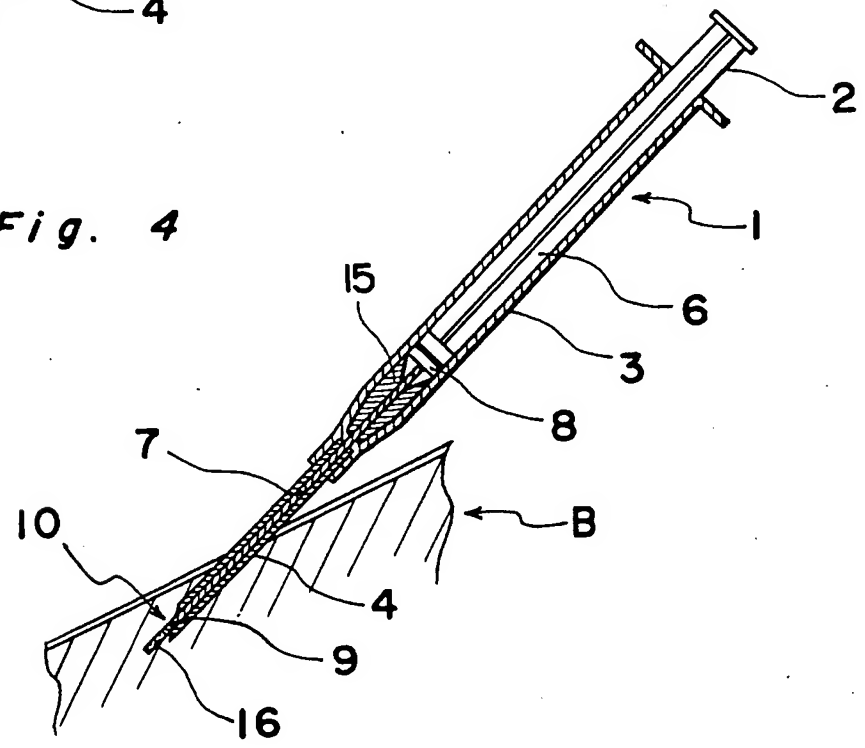

Fig. 5

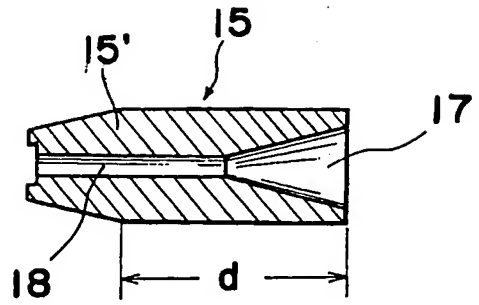

Fig. 6

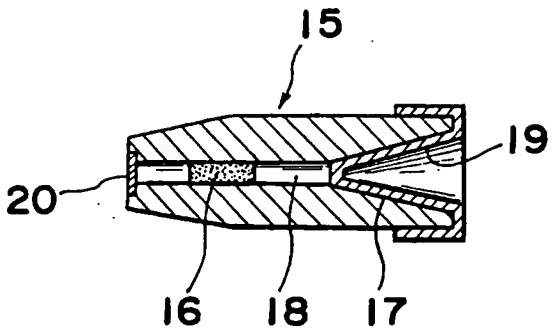

Fig. 7

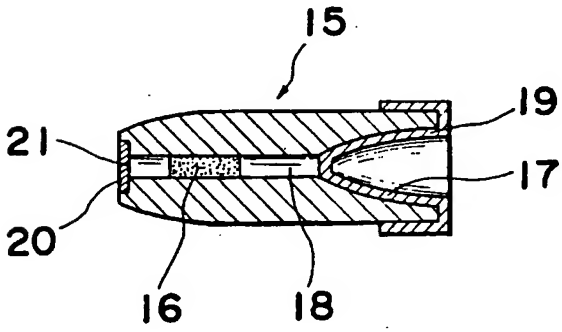

Fig. 8

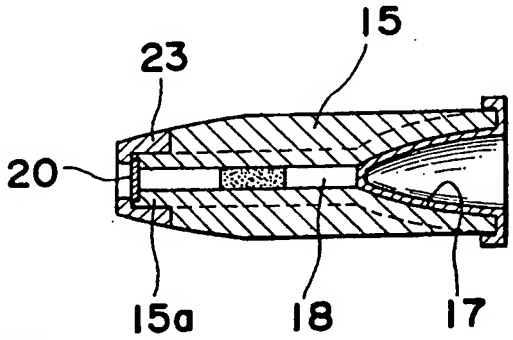

Fig. 9